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Inflation Stabilization in Turkey

An Application of the RMSM-X Model

Luc Everaert

Adding estimated behavioral equations to the standard RMSM-X model allows it to simulate the short-run consequences of inflation stabilization.

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This paper — a product of the Country Operations Division, Country Department I, Europe and Central Asia Region — is part of a larger effort in the Region to enhance its macroeconomic monitoring capabilities. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Barbara Mondestin, room H5-105, extension 36071 (51 pages). January 1992.

The model Everaert persents is an extension of the simple RMSM-X model developed to improve the Country Operations Division's macroeconomic monitoring and modeling capabilities. Adding econometrically estimated behavioral equations and the use of lagged relationships makes the model fit for short-run simulations while maintaining an essentially recursive structure and thus keeping computational costs at a minimum.

First, Everaert reviews the theoretical framework of an inflation stabilization program. In the absence of price rigidities, a reduction in inflation simply implies finding a replacement for revenue lost from a decline in the inflation rate. In reality, backward-looking nominal contracts and credibility problems induce short-run costs, making a fall in the economic growth rate an inevitable part of inflation stabilization. The theoretical framework yields the specification of a few key behavioral equations to be implemented in the model.

Next, Everaert shows in detail how this theoretical framework is implemented in the RMSM-X model by specifying demand and supply sides of all markets. An econometrically estimated short-run price equation plays a key role.

Everaert's simulation results show that even if a credible program is implemented, at least two years of negative per capita growth are needed to bring inflation down from its current levels to below 10 percent a year. The accompanying fiscal effort is great: the equivalent of a 40 percent increase in direct tax revenues if no other expenditure or revenue measures are taken. Scenarios that do not incorporate strong fiscal action do not succeed in permanently lowering inflation and lead to lower per capita GDP at the end of the decade than does the scenario of fiscal stabilization. Inflation in the Turkish context is costly because it reduces not only the level of productive investment but also its efficiency.

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Inflation Stabilization in Turkey: An Application of the RMSM-X Model

by

Luc Everaert*

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The World Bank has recently upgraded its Revised Minimum Standard Model, from an set of projection rules for the balance of payments and the national accounts, to a RMSM-X (eXtended), which attempts to model the interaction of the different sectors of an economy in a consistent manner. This macro-model is mainly used for medium-term projections required to guide the Bank's operational decisions. The model focuses on the budget constraints of the different sectors, especially on the fiscal accounts and the foreign sector (the balance of payments) as they are key determinants of the macroeconomic balances. The RMSM-X model contains few estimated relations since for most countries good time series data is unavailable and frequent shifts in policy-regimes make most estimated parameters unstable.

The purpose of this paper is to show how, by making creative use of lagged economic relationships and adaptive price setting mechanisms (ie. backward looking contracts), the RMSM-X model can be used for short-term policy simulations. In particular, attention is paid to the short-run output costs of inflation stabilization as a result of price rigidities. The recursive solution of the model, leading to quantity closures of different markets does lower the confidence one can have in the point forecasts of the simulation. By testing the sensitivity of the simulations to the chosen path of the key intermediate variable (in this case the domestic real interest rate), and by checking whether the solution enters in the confidence interval of existing econometrically estimated equations, not incorporated in the model, this confidence can be greatly enhanced.

This paper first reviews the main features of the basic RMSM-X model and then applies the model to the problem of inflation stabilization in the Turkish context. The second section of the paper establishes the theoretical framework for the analysis of the problem of disinflation. The third section shows how the RMSM-X model can be adapted for short-run policy simulations by incorporating some additional estimated behavioral equations. The fourth section the paper reviews briefly the relevant recent economic developments in Turkey and then presents a scenario of adequate fiscal adjustment that leads to a sustainable reduction of inflation. This scenario is compared with a policy of monetary contraction without fiscal support. In both scenarios attention is paid to price rigidities which lead to short-run adjustment costs in terms of output lost. A final section summarizes the main findings.

1. THE STRUCTURE OF THE MODEL

The RMSM-X model starts conceptually from a flow-of-funds matrix which contains the budget constraints of all the specified sectors in the economy. In this way, no matter how the variables entering the budget constraints are projected, consistency is assured. In order to

introduce meaningful economic behavior in the model, markets need to be added to the budget constraints and demand and supply behavior needs to be specified. Since only a limited set of variables can be solved for endogenously, the specification of this set determines the nature of the closure of the model.

1.1. THE BUDGET CONSTRAINTS

The model assures consistency in the projections by requiring that the budget constraints for the economic sectors are satisfied at all times. Six different sectors are identified in the Turkey model: (i) the non-financial State Economic Enterprises, (ii) the rest of the non-financial public sector, which is called "budget", (iii) the private non-financial sector, (iv) the central bank, (v) the domestic banking system, and (vi) the foreign sector. The symbols used in the budget constraints throughout the paper are explained in Table 1.1.[1/] Figure 1.1 presents the budget constraints of the six sectors in flow-of-funds format, omitting the time subscript for current end-of-period stocks and for flows occurring during the current period to save notation.[2/] Each budget constraint consists of two statements of the type:

CURRENT INCOME - CURRENT EXPENDITURE = SAVING

SAVING = NET ACCUMULATION OF WEALTH

The top half of Figure 1.1 presents the current account of all sectors in matrix format while the bottom half shows the capital account. All budget constraints are defined in nominal terms and include sufficient detail in order to distinguish the most relevant categories of income, expenditure and changes in assets for each of the sectors. In both matrices, rows represent incoming and columns outgoings. The specification of the various entries in the matrices is

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[1/] Throughout the paper we will use the following conventions:

$\delta X = X - X_{-1}$; $\quad \hat{X} = \delta X / X_{-1}$

A superscript asterisk indicates a foreign currency denominated variable.

[2/] For a more detailed description of the budget constraints and the flow-of-funds concept see Everaert et. al. (1990).

TABLE 1.1: DEFINITIONS OF VARIABLES IN BUDGET CONSTRAINTS

Variables with an asterisk are defined in US$. The rest of the variables are expressed in local currency at current prices except for those variables marked with (#) which are defined in constant terms.

B	Bonds
C	Consumption (#)
CR	Credit from the Central Bank
CU	Currency in circulation
DD	Demand deposits
E	Average exchange rate
F^*	Net foreign-currency denominated borrowing
FG^*	External debt
FX^*	Foreign currency deposits with domestic sectors
FI	Factor income
I	Investment (#)
i^*	Nominal foreign interest rate
i_D	Nominal interest rate on deposits
i_C	Nominal interest rate on credits
i_R	Nominal rate of rediscount
IM	Imports (#)
KT	Capital transfers
NW	Net worth
OFI	Other factor income
P&L	Distributed profits
PR^*	Profit remittances abroad
R^*	Foreign reserves
RR	Legal reserves
S	Savings
SUB	Subsidies
T	Net current transfers
T^*	Net transfers from abroad
TD	Direct taxes
TI	Indirect taxes
VA	Value added
WR^*	Workers, remittances from abroad
X	Exports (#)

Sector-specific variables and intersectoral flows are represented by the following suffixes at the end of each variable:

b	Budgetary government
c	Central Bank
d	Banking system
o	Other non-financial public sector (SEEs)
g	Consolidated non-financial public sector
p	Private sector
m	Consolidated monetary sector
f	Foreign sector
t	Total

FIGURE 1.1: SOURCES AND USES OF FUNDS MATRIX

CURRENT ACCOUNT

	Government Budget	Other Public	Private Sector	Central Bank	Banking System	Balance of Payments	Production Account	Total Sources
Government Budget		TD_o	TD_p	$P\&L_c$		$E \cdot Tf^*_b$	TI $-SUB$ OFI_b	
Other Public	Tb_o						Fi_o	
Private Sector	T_{bp} $i_C \cdot B_{bp}$				$i_D \cdot DD$ $P\&L_d$	$E \cdot Tf^*_p$ $E \cdot MR^*_p$	VA_p	
Central Bank	$i_R \cdot CR_b$	$i_R \cdot CR_o$			$i_R \cdot CR_d$	$i^* \cdot (R^*_c - F^*_c)$		
Banking System	$i_C \cdot B_{bd}$	$i_C \cdot B_{od}$	$i_C \cdot B_{pd}$					
Balance of Payments	$E \cdot i^* \cdot F^*_b$	$E \cdot i^* \cdot F^*_o$	$E \cdot i^* \cdot F^*_{dp}$ $E \cdot PR^*$	$E \cdot i^* \cdot F^*_c$	$E \cdot i^* \cdot F^*_d$		IM_t $-X_t$	
Consumption and Savings Account	C_b S_b	S_o	C_p S_p	δNW_c	δNW_d	S_f		
Total Uses								

CAPITAL ACCOUNT

	Government Budget	Other Public	Private Sector	Central Bank	Banking System	Balance of Payments	Savings Account	Total Sources
Government Budget			δB_{bp}	δCR_b	δB_{bd}	$E \cdot \delta F^*_b$	S_b	
Other Public	KT_{bo}		δB_{op}	δCR_o	δB_{od}	$E \cdot \delta F^*_o$	S_o	
Private Sector	KT_{bp}	KT_{op}			δB_{pd} KT_{dp}	$E \cdot \delta F^*_p$ $E \cdot \delta DFI^*$	S_p	
Central Bank			δCU_p		δRR δCU_d	$E \cdot \delta F^*_c$	δNW_c	
Banking System	KT_{bd}		δDD	δCR_d		$E \cdot \delta F^*_d$	δNW_d	
Balance of Payments				$E \cdot \delta R^*_c$			S_f	
Investment Account	I_b	I_o	I_p					
Total Uses								